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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,639	12/27/2001	Jun Tatsuta	217713US2	7751

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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

CRUZ, LOURDES C

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 03/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/026,639

Applicant(s)

TATSUTA ET AL.

Examiner

Lourdes C. Cruz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 22-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Applicant's election with traverse of Group I invention in Paper No. 5 is acknowledged. The traversal is on the grounds that searching all the inventions in the application will "not place a serious burden on the Examiner". This is not found persuasive because as pointed out in the Office Action mailed November of 2002, Applicant claims a method of manufacturing and a product made which require the examiner gives consideration to two different inventions, and search both inventions giving the "method of making" and the apparatus proper weight for what the recitation of such implies.

The examiner disagrees with the statement made by applicant that a serious burden will not be put on the examiner. The examiner has clearly stated that the Application contains more than one invention classified in two different classes.

The requirement is still deemed proper and is therefore made **FINAL**.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference signs mentioned in the description: 13 (Page 16). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign not mentioned in the description: 110.

A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the multi-layered bump of claim 9 must be shown or the feature canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: It is unclear to the examiner if Applicant intends to recite more than one material making up conductive layer 12 or alternative materials (Page 10, lines 3+). Also (Page 10, lines 17+), applicant is defining Ra by saying that at least "a top" surface should be within a given range. What is "a top"?

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites a substrate comprising a substrate, which has rendered the scope of the claim unclear. For the purpose of this Office Action the examiner will presume only one substrate is being claimed.

Claims 3,4 recite "linear expansion". Does Applicant mean thermal expansion? The examiner is unable to properly ascertain the property of the material that Applicant intends to define.

Claims 5 recites, "surface roughness". The examiner cannot determine from the specification whether Applicant means to define texture in order to improve adhesion or simply a height/width range (see page 10).

More over, claims **5 and 6** have been deemed un-examinable since claim 1 defines the first bump as a conductive layer, yet roughness in claim 1 is claimed in light of the range defined in page 10 as to refer to projection 10. **Claim 6** was rendered unclear since applicant seems to be giving "bump" a double meaning. If the first bump is all conductive as a result of forming a conductive layer as recited in claim 1, how can a side/ a part of it be non-conductive? In light of the 35 U.S.C. 112 rejections supra, there is a great deal of confusion and uncertainty as to the proper interpretation of the limitations of the claim; hence, it would not be proper to reject the claim on the basis of prior art. As stated in *In re Steele*, 305 F.2d 859, 134 USPQ 292 (CCPA 1962), a rejection should not be based on considerable speculation about the meaning of terms

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employed in a claim or assumptions that must be made as to the scope of the claims.

See also MPEP 2173.06.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4,7-10 and 12-15, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Akram et al. (US 5789278).

Akram et al. discloses (See cover figure) a semiconductor chip mounting substrate (16A) comprising:

At least one projection 44 thereon, which is integrally molded with said substrate; a first bump 30 obtained by forming a conductive layer on the projection; and a semiconductor chip 18 having a terminal projecting as a second bump on its surface (see unlabeled bumps between 18 and 14); wherein said semiconductor chip is mounted on said substrate such that said first bump contacts said second bump, and said chip mounting substrate comprises a pressure holding means 28 for providing a required contact pressure between said first and second bumps.

Akram et al. also discloses:

- 28 being a resin
- regarding the linear expansion claimed (see that page 16, lines 10+ of the specification define material 3 of the present invention as an ACF) the prior art discloses an ACF (see Col. 5) which is therefore believed to read on the claims and fall within the claimed range since linear expansion or the material have not been clearly defined in the claims to be something else rather than that disclosed by Akram et al.
- a second projection (any other 44) preventing excessive contact pressure when the chip is mounted
- see that the area between bumps is covered by conductive material
- concave between projections containing resin material
- a conductive layer (not labeled) underneath 30 acting as a cushion member and having high plastic deformation capability in as much as "high" clearly define a range
- said first bump is of tapered shape having a flat top end, and a value determined by dividing a height of said first bump by a diameter of a circle having substantially the same area as a base of said first bump is .05 or more in as much as ".05" clearly specify any range
- said pressure holding means is a pressure holding member 14 having a first surface (surface facing bumps) adapted to contact a

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surface opposed to said second bump (any surface around the bump) of said chip extending around said first surface, wherein the second surface of said pressure holding member is bonded to said substrate (through said filler 28)

- said concave sealed air-tight

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Akram et al.

See that Akram et al. describe all the structural limitations above. However, see that Akram et al. fails to specifically describe a mounting substrate wherein:

- said conductive layer includes a nickel layer having a thickness of 5 μm or more

Nevertheless, see that nickel is widely used among semiconductor artisan and therefore well known in the art. Also, see that:

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The thickness claimed does not cause any critical or unexpected results to the device's operation. Rather it is merely an obvious design choice determined by routine experimentation. In *Aller*, the court stated "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456 105 USPQ 233,235 (CCPA 1995).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a nickel layer of the specific thickness claimed since nickel is widely known for being a good conductor and to provide a layer that is thick enough to provide good adhesion.

Allowable Subject Matter

Claims 16,18,19,20,21 would be allowable if rewritten to overcome the rejections under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. Claim 16 more specifically describes the pressure holding member, all other claims claim a window in the member.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lourdes C. Cruz whose telephone number is 703-306-5691. The examiner can normally be reached on M-F 10-6:30.

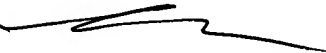
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers

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for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Lourdes C. Cruz
Examiner
Art Unit 2827



Lourdes Cruz
March 9, 2003



DAVID L. TALBOTT
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800